DRAFT PROJECT REPORT SPECIFICATIONS

FOR THE

KANAKA BAR INDIAN BAND

KWOIEK CREEK HYDROELECTRIC PROJECT

July 24, 2001

Prepared by

Kwoiek Creek Hydroelectric Project Committee

DOC
BC
E5243
D:K36d
2001
c.3

3 3298 00253 3140

Preface

The Kanaka Bar Indian Band has made an application for a project approval certificate under the British Columbia *Environmental Assessment Act* (*EA Act*) for the Kwoiek Creek Hydroelectric Project, a new 80 megawatt (MW) "run-of-the-river" hydroelectric power plant to be located near the mouth of Kwoiek Creek on the west bank of the Fraser River, approximately 14 kilometres south of Lytton, BC. The project is subject to review under the British Columbia *EA Act* and the federal *Canadian Environmental Assessment Act* (*CEAA*).

The Kanaka Bar Indian Band has been ordered to prepare a Project Report (or stage 2 report) for the Kwoiek Creek Hydroelectric Project to address outstanding issues related to its application for a project approval certificate.

This document outlines, in draft form, the Project Report specifications that the proponent is to follow in the preparation of its Project Report. The enclosed requirements have been prepared by the Kwoiek Creek Hydroelectric Project Committee based on input from the public, First Nations, federal, provincial, and local government agencies.

The draft Project Report specifications are being made available to the public, First Nations and government agencies for review and comment pursuant to the *EA Act*. Comments on the draft Project Report specifications will be accepted by the Environmental Assessment Office (EAO) until August 24, 2001. Final changes will be made to the Project Report specifications following review of any comments received on the draft Project Report specifications. Please address your comments to Derek Griffin, Environmental Assessment Office, PO Box 9426 Stn Prov Govt, Victoria, BC V8W 9V1 or by fax at (250) 387-2208 or by email at derek.griffin@gems4.gov.bc.ca.

Table of Contents

Preface i
Table of Contents ii
List of Figures iv

1 Introduction & Background Information 1

1.1 Introduction & Purpose of Project Report Specifications 1
1.2 Description of the Kwoiek Creek Hydroelectric Project 2
1.3 BC Environmental Assessment Review Process 6
1.3.1 Overview 6
1.3.2 Trigger for EA Review 7
1.3.3 Scope of the Environmental Assessment 7
1.3.4 Initiating the Review and Establishing the Project Committee 8
1.3.5 First Nations Involvement 9
1.3.6 Project History 10
1.3.7 Consultation 11
1.3.7.1 Pre-Application 11
1.3.7.1.1 Government Agency Consultation 11
1.3.7.1.2 Public Consultation 12
1.3.7.1.3 First Nations Consultation 12
1.3.7.2 Stage 1 Consultation: Application Review 13
1.3.7.2.1 Public Comment Period 13
1.3.7.2.2 Adequacy of Proponent's Consultation 13
1.3.7.2.3 Government Agency Consultation 14
1.3.7.2.4 Public Consultation 14
1.3.7.2.5 First Nations Consultation 14
1.3.7.3 Proponent Response to Comments 15
1.3.8 Project Committee Recommendation 15
1.3.9 Preparation of Draft Project Report Specifications 16
1.4 Overview of Canadian Environmental Assessment Act Requirements 16
1.5 Concurrent Review of Provincial Permits 17

2 Project Report Specifications 18

2.1 General Instructions 18
2.2 Project Proponent, Design and Consultation Specifications 19
2.2.1 Project Proponent 19
2.2.2 Project Schedule 20
2.2.3 Project Description 20
2.2.3.1 Power Intake Structure 21
2.2.3.2 Water Conveyance System 21
2.2.3.2.1 Penstock Option 22
2.2.3.2.2 Tunnel Option 22
2.2.3.3 Powerhouse and Switchyard 23
2.2.3.4 Tailrace 23
2.2.3.5 Transmission Line 23

2.2.4 Public Consultation 24
2.3 Environmental Specifications 25
2.3.1 Water Management 25
2.3.1.1 Water Licensing 25
2.3.1.2 Hydrology and Discharge Flows 25
2.3.1.3 Ice Regime 26
2.3.2 Water Quality 27
2.3.2.1 Water Quality Monitoring Program 27
2.3.2.2 Temperature 28
2.3.2.3 Total Gas Pressure (TGP) 29
2.3.2.4 Sediment and Bedload 29
2.3.2.5 Settling Ponds 30
2.3.2.6 Blasting 30
2.3.2.7 Metal Leaching/ Acid Rock Drainage (ML/ARD) 31
2.3.3 Fish and Fish Habitat 32
2.3.3.1 General 32
2.3.3.2 Red and Blue Listed Fish Species 32
2.3.3.3 Ramping Rates and Stranding Potential 33
2.3.3.4 Entrainment 33
2.3.4 Wildlife, Wildlife Habitat and Vegetation 35
2.3.4.1 General 35
2.3.4.2 Red and Blue Listed Species 35
2.3.4.3 Northern Spotted Owl (Red Listed) 36
2.3.4.4 Harlequin Duck (Yellow Listed) 36
2.3.4.5 Mountain Goats 36
2.3.4.6 Grizzly Bears 37
2.3.4.7 Wildlife Trees 38
2.3.4.8 Plant Species and Plant Communities 38
2.3.4.9 Noise: Potential Wildlife Displacement 39
2.3.4.10 Migratory Birds 39
2.3.5 Cumulative Environmental Effects 40
2.3.6 Environmental Management Plan (EMP) 41
2.3.6.1 Construction Monitoring Requirements 42
2.3.6.2 Accidents and Malfunctions 43
2.3.6.3 Post Construction Monitoring Requirements 43
2.3.7 Greenhouse Gases (GHG) 44
2.4 Cultural & Heritage Specifications 44
2.4.1 Archaeological Resources 44
2.4.2 Project Effects on First Nation Interests, including Traditional Activities 45
2.5 Socio-Economic Specifications 46
2.5.1 Project Impacts and Benefits 46
2.5.2 Recreation and Tourism Effects 46
2.5.3 Transportation Effects 47
2.6 Land Use Issues 47
2.6.1 Lillooet LRMP 47
2.6.2 Parks/Ecological Reserves 48

2.6.3 Zoning, Land Tenure and Related Issues 48
2.7 Health Specifications 49
2.7.1 Sewage for Construction Camp 49
2.7.2 Electric and Magnetic Fields (EMFs) 49

List of Figures

Figure 1. Kwoiek Creek Hydroelectric Project site map. 3
Figure 2. Proposed powerhouse area and tailrace. 4
Figure 3. Transmission line options. 5

1 Introduction & Background Information

1.1 Introduction & Purpose of Project Report Specifications

The Kanaka Bar Indian Band (the proponent) has made an application for a project approval certificate under the British Columbia *Environmental Assessment Act* (*EA Act*) for the Kwoiek Creek Hydroelectric Project, a new 80 megawatt (MW) "run-of-the-river" hydroelectric power plant to be located near the mouth of Kwoiek Creek on the west bank of the Fraser River, approximately 14 kilometres south of Lytton, BC The project is subject to review under the British Columbia *EA Act* and the federal *Canadian Environmental Assessment Act* (*CEAA*).

In accordance with the *EA Act*, a Project Committee has been established to steer the environmental assessment of this project. The Project Committee is comprised of federal and provincial government and First Nations representatives, and is the primary source of policy and technical expertise for the review of the project application.

The Kwoiek Creek Hydroelectric Project Committee has reviewed the application submitted by the proponent, the comments from the public, First Nations and government agencies on the application, and the proponent's responses to these comments. The Project Committee has concluded that the potential effects of the project have not yet been adequately described and that the application has not set out practical measures for mitigating or preventing all the significant adverse effects of the project. On this basis, the Project Committee has recommended that the Kanaka Bar Indian Band be ordered to prepare a Project Report (or stage 2 report) for the Kwoiek Creek Hydroelectric Project.

This document outlines the Project Report specifications in draft form that the proponent is to follow in the preparation of its Project Report. They have been prepared by the Kwoiek Creek Hyrdoelectric Project Committee based on input from the public, First Nations, federal, provincial, and local government agencies. They identify outstanding issues that need to be addressed by the proponent in its Project Report. The proponent is required to prepare the Project Report in accordance with the final Project Report specifications and to submit that report to the Environmental Assessment Office (EAO) for review.

Once the Project Report has been submitted, the Project Committee will have a maximum of 25 days to screen the Project Report to determine if it meets the final form of the Project Report specifications and can be accepted for review. If accepted, another public comment period (between 45 and 60 days in duration) will be established, during which time the public will be invited to review and provide comments on the Project Report.

Following the public comment period on the Project Report, the Project Committee will have a maximum of 70 days to consider all the information submitted and to make recommendations to the Executive Director of the EAO. The Executive Director will

then refer the Project Committee's recommendations to the Minister of Sustainable Resource Management and the Minister of Energy and Mines. The Ministers are provided 45 days to decide whether to certify or reject the project, or to require further review through a public hearing (Stage 3).

1.2 Description of the Kwoiek Creek Hydroelectric Project

The proposed Kwoiek Creek Hydroelectric Project is an 80 megawatt (MW) "run-of-the-river" hydroelectric power plant to be located near the mouth of Kwoiek Creek on the west bank of the Fraser River, approximately 14 kilometres south of Lytton, BC

For the purposes of the environmental assessment, the project consists of the construction and operation of:

- a new powerhouse with a total capacity of 80 MW near the mouth of Kwoiek Creek on IR 4;
- a concrete weir, sediment basin, sluice gate and intake structure located on Kwoiek Creek approximately 10 kilometres upstream of its confluence with the Fraser River;
- either a tunnel or a buried penstock from the intake to the powerhouse, and a 5kV distribution line from the powerhouse to the intake structure;
- waste rock disposal sites, if the tunnel option is put forth in the Project Report;
- a tail race channel from the powerhouse returning water to Kwoiek Creek;
- gravel source located on IR4;
- a construction camp located on IR4;
- rail offload facilities on IR4;
- a switchyard with the transformer raising the generator voltage to the transmission line voltage;
- a 70 kilometre 138kV transmission line connecting with the Highland Valley Copper substation at Spatsum, north of Spences Bridge (Option 1); and
- upgraded access roads for construction purposes.

The proposed site plan for the project - including water conveyance and transmission line options - is shown in Figures 1 to 3.

The proposed hydroelectric system will be designed to divert water out of Kwoiek Creek at an elevation of approximately 810 metres above sea level by means of a weir/diversion structure built across Kwoiek Creek. The water will first flow into a sedimentation chamber which will return the sediment and some of the flow back into Kwoiek Creek. A maximum of 15.0 m^3/s will flow into a 2.0 m diameter by 10,000 m long penstock or a 10,000 m long tunnel to a powerhouse on the bank of the Fraser River (elevation approximately 120 metres above sea level).

The presently proposed powerhouse layout calls for 80 MW of installed capacity composed of two 40 MW Pelton type turbines. These units, operating at a maximum of 100 percent of their name plate capacity would generate 80 MW, requiring 15.0 m^3/s of water. Pelton type units can be operated reasonably efficiently and

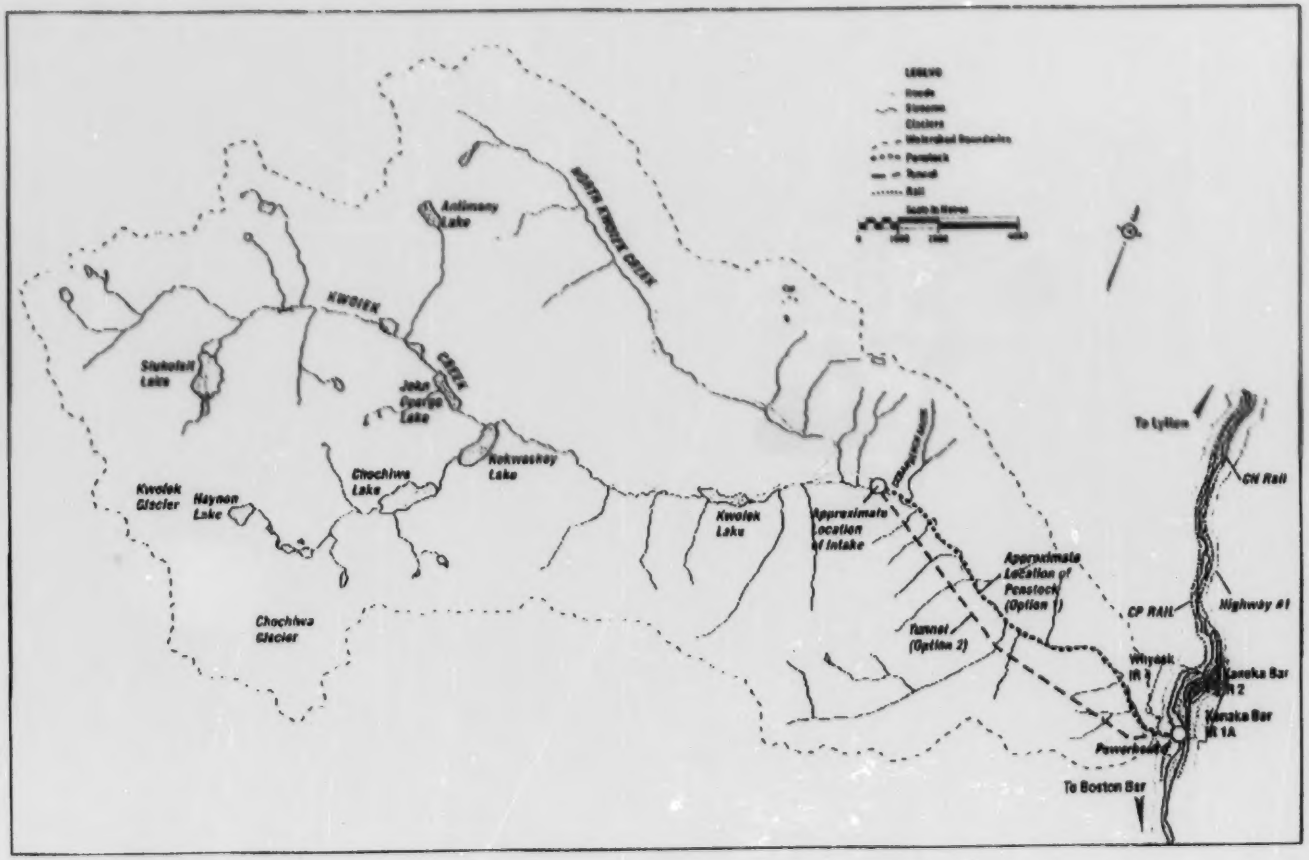

Figure 1. Kwoeik Creek Hydroelectric Project site map.

Figure 2. Proposed powerhouse area and tailrace.

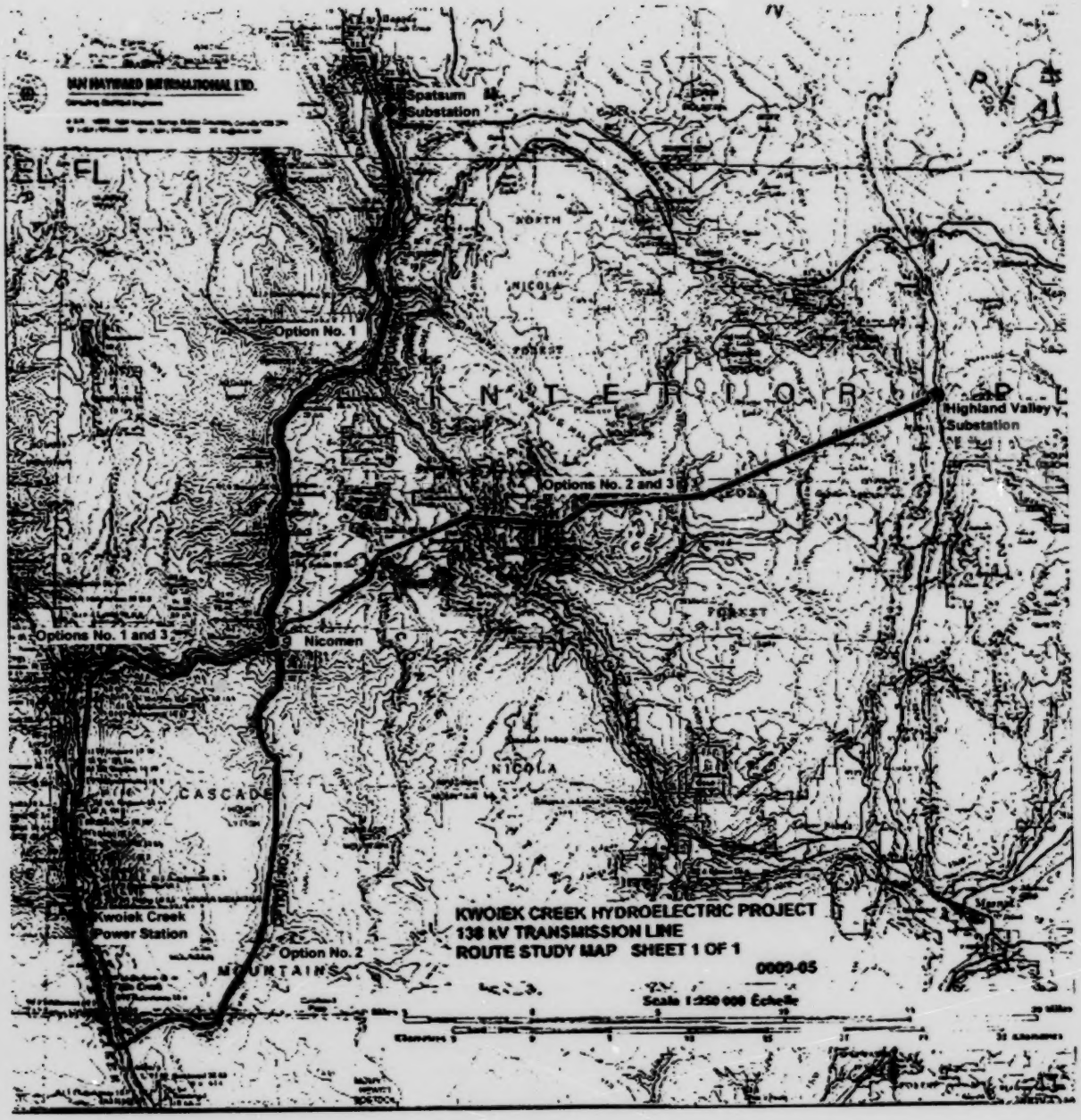

Figure 3. Transmission line options.

without incurring damage down to about 15 percent of their normal capacity. This means that, in the case of one unit, it could be operated down to about 6.0 MW, requiring approximately 1.1 m^3/s of flow.

Based on 21 years of monthly flow data (1974-1999), the monthly power generation could range from 0 MW in January-March to 80 MW in June-September. The project is expected to produce between 222 and 326 gigawatt-hours (GWh) of electricity per year (mean energy production of 266 GWh annually).

The proponent proposes a riparian release of 0.5 m^3/s to maintain a minimum stream flow between the intake and the tailrace discharge. By automated regulation of the turbine output, the level of the water passing over the weir will be maintained such that there will be at least 0.5 m^3/s being released as fish flow into the creek downstream.

When Kwoiek Creek discharge is less than 1.6 m^3/s (minimum release flow plus minimum flow that can be used by the turbines), the hydroelectric plant will not operate and all water will pass over the weir and move downstream in the natural creek bed. When discharge is between 1.6 and 15.0 m^3/s, the minimum flow release of 0.5 m^3/s will be maintained between the intake and the tailrace. The minimum flow release will pass through a notch in the weir designed for this purpose. At discharges greater than 15.0 m^3/s all excess flow will pass over the weir and continue downstream in the creek. This surplus water will flow both through the notch in the weir and over the full width of the weir structure.

The estimated total cost of the project is $80-90 million over a three-year period. Once operational, about $500,000 will be spent each year for ongoing operation and maintenance.

The project is expected to create 100 construction jobs, with a construction period of approximately two years. Operation of the plant will provide six full-time jobs.

1.3 BC Environmental Assessment Review Process

1.3.1 Overview

There are three possible stages of review under the *EA Act*. Stage 1 (Application stage) involves a review of the Application for a project approval certificate. Stage 2 (Project Report stage) entails the review of a more detailed Project Report prepared by the proponent on issues not addressed or adequately covered in the Application. Stage 3 consists of a formal public hearing to address any remaining outstanding issues.

Each stage includes substantial opportunities for public and First Nation involvement. Upon completion of the first or second stages, a project can be approved, rejected or sent on to the next stage. Projects proceed to successive stages of review if outstanding issues remain.

1.3.2 Trigger for EA Review

Pursuant to section 30(1) of the *Environmental Assessment Reviewable Projects Regulation*, the construction of a new hydroelectric power plant facility constitutes a reviewable project for the purposes of the *EA Act* if the facility has, or when the construction phase is completed will have, a rated nameplate capacity of 50 megawatts (MW) or more of electricity.

The proposed Kwoiek Creek hydroelectric power plant will have a capacity of 80 MW of electricity. The Kwoiek Creek Hydroelectric Project is therefore reviewable under the *EA Act*.

1.3.3 Scope of the Environmental Assessment

Environmental assessments conducted under the *EA Act* are comprehensive and include consideration of all significant environmental, economic, cultural, heritage, social and health effects of the proposed project.

The assessment of the Kwoiek Creek Hydroelectric Project covers the design, construction and operations of onsite and offsite facilities associated with the project. The current assessment does not require detailed consideration of the dismantling or abandonment of the project.

The scope of the project consists of the following proposed on-site and off-site physical project components:

<u>On-site Facilities</u>

- a new powerhouse with a total capacity of 80 MW near the mouth of Kwoiek Creek on IR 4;
- a concrete weir, sediment basin, sluice gate and intake structure located on Kwoiek Creek approximately 10 kilometres upstream of its confluence with the Fraser River;
- either a tunnel or a buried penstock from the intake to the powerhouse, and a 5kV distribution line from the powerhouse to the intake structure;
- a tail race channel from the powerhouse returning water to Kwoiek Creek;
- a switchyard with the transformer raising the generator voltage to the transmission line voltage;

<u>Off-site Facilities</u>

- waste rock disposal sites, if the tunnel option is put forth in the Project Report;
- gravel source located on IR4;
- a construction camp located on IR4;
- rail offload facilities on IR4;
- a 70 kilometre 138kV transmission line connecting with the Highland Valley Copper substation at Spatsum, north of Spences Bridge (Option 1); and
- upgraded access roads for construction purposes.

1.3.4 Initiating the Review and Establishing the Project Committee

The application for a project approval certificate for the proposed Kwoiek Creek Hydroelectric Project (project) was submitted by the Kanaka Bar Indian Band to the EAO on March 5, 2001. The application satisfied the requirements of section 7(2) of the EA Act and was accepted for review on March 12, 2001. Copies of the application were sent to government agencies on March 19, 2001 and made available to the public shortly thereafter. The proponent hand-delivered copies of the application to First Nations in the vicinity of the project between March 22 and April 6, 2001. Comments on the application were invited until May 25, 2001.

In March/April 2001, the EAO established a Project Committee to conduct the review of the proposed project. The Project Committee, consisting of representatives from provincial and federal governments and First Nations, held its first meeting in Lytton, BC on April 10, 2001. Subsequent meetings were held on May 30, 2001 in Lytton and July 18, 2001 in Vancouver. The Project Committee considered comments received from the public, First Nations and government agencies in its review of the application.

The Kwoiek Creek Hydroelectric Project Committee members represent the following government agencies and First Nations:

Provincial Government
Environmental Assessment Office (EAO)
Ministry of Sustainable Resource Management (MSRM)
Ministry of Water, Land and Air Protection (MWLAP)
MSRM – Archaeology Branch (MSRM – Archaeology)
Ministry of Competition, Science and Enterprise (MCSE)
Ministry of Energy and Mines (MEM)

Federal Government
Department of Fisheries and Oceans - Habitat & Enhancement Branch (DFO)
Environment Canada (EC)
Indian and Northern Affairs Canada (INAC)

First Nations
Siska Indian Band (affiliated with Nicola Tribal Association)

Several government agencies declined to participate as members on the Project Committee but participated as review agencies and submitted comments on the application based on their mandate. These agencies are:

Provincial Government
BC Assets and Lands Corporation (BCAL)
British Columbia Utilities Commission (BCUC)
Land Reserve Commission (LRC)
Ministry of Community, Aboriginal and Women's Services (MCAWS)

Ministry of Agriculture, Food and Fisheries (BCFISH)
Ministry of Forests (MOF)
Ministry of Health Services/Thompson Health District (MOHS)
Ministry of Transportation (MOT)

Federal Government
Canadian Environmental Assessment Agency (CEAA)
DFO - Canadian Coast Guard (CCG)
EC – Canadian Wildlife Service (CWS)
Health Canada
Natural Resources Canada (NRCan)
Parks Canada
Transport Canada

Local Government
Fraser Valley Regional District
Thompson-Nicola Regional District
Village of Lytton

First Nations

Nation	Affiliation	Member bands
Nlaka'pamux	Fraser Canyon Tribal Administration	Kanaka Bar Indian Band Nicomen Indian Band Skuppah Indian Band
	Nlaka'pamux Nation Tribal Council	Ashcroft Indian Band Boothroyd Indian Band Boston Bar Indian Band Oregon Jack Indian Band Spuzzum Indian Band
	Nicola Tribal Association	Coldwater Indian Band Cook's Ferry Indian Band Lower Nicola Indian Band Upper Nicola Indian Band Nooaitch Indian Band Shackan Indian Band
	Unaffiliated	Lytton Indian Band

1.3.5 First Nations Involvement

The proposed Kwoiek Creek Hydroelectric Project's power generation and transmission facilities will be located in the traditional territory of the Nlaka'pamux Nation which extends from Ashcroft in the north to the headwaters of the Skagit River in the south; and from Harrison Lake eastward to the headwaters of the Tulameen and Coldwater Rivers.

At the present time, there are 16 member bands of the Nlaka'pamux Nation and three First Nations administrative bodies in the project area. The Fraser Canyon Tribal

Administration administers three bands - Kanaka Bar, Nicomen and Skuppah. The Nlaka'pamux Tribal Council administers five bands - the Ashcroft, Boothroyd, Boston Bar, Oregon Jack Creek and Spuzzum.

The Nicola Tribal Association administers seven bands - the Coldwater, Cook's Ferry, Lower Nicola, Upper Nicola, Nooaitch, Siska and Shackan. The Lytton Band is unaffiliated.

The EAO invited all member bands of the Nlaka'pamux Nation to sit on the Project Committee on February 21, 2001. All member bands were provided copies of all review documents, including the Application.

On April 3, 2001, the EAO sent a letter to all member bands of the Nlaka'pamux Nation advising them of various logistics of the EA review process, including information regarding the first Project Committee meeting (April 10, 2001) and the assessment of public and First Nations consultation activities.

On April 25, 2001, the EAO sent a letter to all member bands of the Nlaka'pamux Nation requesting, by May 25, 2001, any available information on:

a) Current or traditional activities practised within the proposed area and where they have taken place; and
b) Technical information or traditional knowledge of the area which would assist in making a decision regarding project approval.

At this time, only the Siska Indian Band has agreed to participate as a Project Committee member. Discussions are ongoing with other Bands and the Tribal Councils concerning the most effective way for them to participate in the review of the Kwoiek Creek Hydroelectric Project.

1.3.6 Project History

The Kanaka Bar Indian Band initiated the plan to develop the hydroelectric potential of Kwoiek Creek and submitted a water licence application for 10 MW of installed capacity to the British Columbia government on February 26, 1990. In 1991, a study to evaluate the hydroelectric development potential of Kwoiek Creek was completed by PBK Engineering Ltd., in association with UMA Engineering Ltd. A total of seven different development options were studied and evaluated.

On June 21, 1994 the Kanaka Bar Indian Band entered into an option agreement to later enter into a joint venture agreement with Powerhouse Development Inc. (PDI) to develop the Kwoiek Creek Hydroelectric Project. Powerhouse Development Inc. is now a wholly owned subsidiary of Powerhouse Energy Corp. (PHE).

In 1999, the project was reactivated following a change in provincial government policy on project justification. In 1999, the BC government removed the requirement that independent power producers (IPPs) have a power sales agreement before completion of an environmental assessment. IPPs now only need to describe

potential markets and the means of accessing them to demonstrate the rationale for their project. An amended water licence application for a 60MW project was submitted by the Kanaka Bar Indian Band on March 30, 1999. Following the withdrawal of the competing water licence applications on Kwoiek Creek in early 2000, the amended water licence application of the Kanaka Bar Indian Band was accepted by the Comptroller of Water Rights on April 20, 2000.

1.3.7 Consultation

1.3.7.1 Pre-Application

The proponent undertook extensive consultations with government agencies, First Nations and the public about the proposed Kwoeik Creek Hydroelectric Project prior to submitting an application for a project approval certificate to the EAO in March 2000. Key meeting dates are noted in the following sections.

1.3.7.1.1 Government Agency Consultation

- On June 14, 2000, representatives of the Kanaka Bar Band and Powerhouse Energy Corp. met with the Environmental Assessment Office and the Water Management Branch. The EAO confirmed that the Kwoiek Creek Power Project was reviewable under subsection 30(1) of the *Environmental Assessment Reviewable Projects Regulation.*
- The EAO's letter of October 5, 2000 to PHE confirmed the requirement for an assessment under the *EA Act* and was copied to the Kanaka Bar Indian Band.
- On November 6, 2000, representatives of the Kanaka Bar Band and PHE met in Lytton with the EAO and federal government agency representatives of the Department of Indian and Northern Affairs (DIAND); the Land Officer from DIAND; and the Aboriginal Advisor from the Department of Fisheries and Oceans to discuss the project review process. Representatives of the EAO, DIAND, DFO, BC Ministry of Environment, Lands and Parks (MELP), BC Ministry of Employment and Investment (MEI) and BC Assets and Lands Corporation (BCALC) toured the project site on November 7, 2000.
- On December 11, 2000, representatives of PHE met in Victoria with representatives of the EAO, Ministry of Environment and federal Department of Fisheries and Oceans to discuss the project schedule, transmission line options, and environmental requirements.
- On December 12, 2000, representatives of PHE, the EAO and the Archaeology Branch of the Ministry of Small Business, Tourism and Culture participated in a conference call to discuss the requirements for an archaeological assessment, First Nations consultation and the socio-economic assessment.
- On January 18, 2001, representatives of PHE, the Environmental Assessment Office and the Archaeology Branch of the Ministry of Small Business, Tourism and Culture toured the project site at Kwoiek Creek.
- On January 18, 2001, a PHE representative met with Lytton Mayor Chris O'Connor to discuss the Lillooet Land and Resource Management Plan planning process and the project's relevance to the Lytton co-generation facility proposed by Lytton Power Ltd.

- On January 23, 2001, a PHE representative provided a telephone briefing on the project to the Chair of the Fraser Valley Regional District and the representative of Area A of the FVRD.
- On January 25, 2001, a PHE representative contacted the Lillooet LRMP Co-ordinator to determine the status of the planning process and request relevant documents. On January 29, PHE contacted the Chair of the LRMP sub-committee discussing the Kwoiek Creek watershed. PHE was advised that no decision had been made with respect to a resource management designation for the Kwoiek Creek watershed but that no concerns had been expressed with respect to the Kwoiek hydro project.

1.3.7.1.2 Public Consultation

- On September 25 and 26, 2000, the public relations consultant to PHE responsible for public consultation aspects of the project met with a number of interested parties in Kamloops, Cache Creek, Lytton, Boston Bar and Chilliwack to brief them on the project status, solicit participation in the public consultation process and update information for the socio-economic assessment of the project.
- Public information meetings were held in Spences Bridge on January 17, 2001 (21 attendees) and in Lytton on January 18, 2001 (52 attendees) to inform the public of the decision to proceed with a PACA and to outline the regulatory review process. Meeting notices were inserted two weeks running in three regional newspapers and were distributed by Canada Post to 900 post office boxes in Boston Bar, Lytton and Spences Bridge. Notices were distributed in the form of posters at Canada Post locations, Indian band offices and other locations. Meeting notices and information packages were mailed to 18 local and regional government agencies and other interested parties.
- PHE also contacted CP Rail, CNR, BC Hydro and Telus Inc. to request personnel contacts for formal project notification and discussion of potential interests related to rights-of-way affecting the Kwoiek Creek transmission line. Formal letters and informational material were mailed to all parties.

1.3.7.1.3 First Nations Consultation

- On December 1, 2000 Chief James Frank issued a letter to all member bands of the Nlaka'pamux Nation to inform them of the Kanaka Bar Indian Band's intention to develop a hydroelectric project at Kwoiek Creek.
- On January 8, 2001 Chief James Frank wrote to all member bands of the Nlaka'pamux Nation providing project overview information and inviting them to attend public information meetings on January 17 and 18, 2001.
- On February 13, 2001, Chief James Frank issued a letter to all member bands of the Nlaka'pamux Nation reporting on the status of the project and attaching the minutes of the January 17-18 public meetings, incorporating a list of questions and answers generated by the meetings.

1.3.7.2 Stage 1 Consultation: Application Review

Following the acceptance by the EAO of the Kwoiek Creek Hydroelectric Project application for review in March 2001, copies of the application were distributed to government agencies and First Nations, and were made available for the public to review.

1.3.7.2.1 Public Comment Period

The application was made available for public review from March 30, 2001 to May 25, 2001. Copies of the application were available for viewing at the EAO Project Registry in Victoria, through the EAO Internet Homepage at www.eao.gov.bc.ca and at the satellite repository established at the Lytton Information Centre (400 Fraser Street, Lytton, BC).

The availability of the application for review was advertised through newspaper notices and through a variety of proponent consultation initiatives (see below). Letters inviting the public to review the application were also mailed directly to approximately 131 interested local citizens and regional and provincial organizations.

On April 26, 2001, mineral tenure holders identified by MEM as being potentially affected by the project were sent notice of the public comment period and requesting them to provide comments by May 25, 2001.

During the stage 1 public comment period, four (4) letters were received from the public.

1.3.7.2.2 Adequacy of Proponent's Consultation

As required by section 14 of the *EA Act*, the EAO reviewed the proponent's public and First Nations information and consultation plans. A written assessment was sent to the proponent on April 25, 2001.

The Project Committee determined that the proposed public consultation plan as outlined in Section 3.4.2.1 and 3.4.2.2 of the Application was acceptable for the application review stage provided that is was implemented well in advance of the public comment deadline of May 25, 2001.

With respect to the proposed First Nations consultation program for the application review stage, the Project Committee advised that a schedule for the proposed meetings and consultation with the Bands in the vicinity of the project needs to be developed, and that further discussions should be held with the EAO on how to approach the Bands to discuss the project, the process, issues, opportunities for input and ongoing dialogue and communication.

On May 23, 2001, the proponent submitted a Public and First Nations Consultation Stage 1 Summary Report summarizing consultation activities conducted from March 12 to May 15, 2001.

1.3.7.2.3 Government Agency Consultation

- On April 4, representatives of Powerhouse Energy Corp. met with the Land Development Officer, Department of Indian and Northern Affairs, to discuss access to reserve lands.
- The proponent provided Project Updates at Project Committee meetings on April 10, 2001 and May 30, 2001.
- MELP and DFO met with the proponent in June 2001 to discuss comments submitted on the Application.

1.3.7.2.4 Public Consultation

- A paid advertisement soliciting public comment on the PACA was published twice in each of four regional newspapers (Hope Standard, Bridge River-Lillooet News, Merritt Herald, Ashcroft Journal); twice in the Rivers Review published by the Lytton Indian Band and once in the Secwepemc News published by the Shuswap Band.
- On April 27, 2001 representatives of Powerhouse Energy Corp. met with representatives of CP Rail to discuss access through CP Rail rights-of-way.
- Between April 30 and May 2, 2001, public meetings were held in Spences Bridge (8 attendees), Lytton (11 attendees) and Boston Bar (12 attendees). Representatives of the Kanaka Bar Band and Powerhouse Energy gave a presentation on the project design and on environmental studies undertaken to date. Meeting notices were published in the four regional newspapers and delivered by Canada Post to 1,118 households in the project area.
- On May 15, 2001 representatives of Powerhouse Energy Corp. met with representatives of Highland Valley Copper in Kamloops to discuss the potential tie-in of the Kwoiek Creek transmission line to Highland Valley Copper's transmission line.
- In April/May 2001, representatives of Powerhouse Energy Corp. initiated contacts with officials of B.C. Hydro to discuss interconnection with Hydro's transmission facilities. PHE engaged a consulting firm to assess the construction and environmental impacts.

1.3.7.2.5 First Nations Consultation

- One April 25, 2001 the Project Manager for the Kanaka Bar Indian Band sent a letter to the Spuzzum, Nicomen and Skuppah bands reviewing the project background, noting the May 25 cut-off date for Stage I comment and noting the dates of scheduled public meetings.
- On April 26, 2001 representatives of the Kanaka, Spuzzum, Nicomen and Skuppah bands met to review the Option Agreement with Powerhouse Energy Corp. and review the schedule of public meetings.
- April 27, 2001 Chief James Frank of the Kanaka Bar Band sent a letter to all member bands of the Nlaka'pamux Nation reviewing the project background, noting the schedule of public meetings, requesting that meeting notices be posted and requesting a meeting of Chiefs in conjunction with a fisheries meeting scheduled for May 2.

- On April 27, 2001 the Project Manager for the Kanaka Bar Band sent a letter to the EAO detailing First Nations consultation activities to date.
- On May 2, 2001, a meeting of representatives of several member bands of the Nlaka'pamux Nation was held in Lytton to discuss the Kwoiek Project.
- On May 15, 2001, a public meeting was held in Merritt specifically for the benefit of member bands of the Nlaka'pamux Nation located in the Nicola Valley. One person attended, representing the Siska Band from the Fraser Canyon. A copy of the meeting notice was sent to 3,500 households in the Nicola Native Lodge News.
- On May 22, 2001 a meeting of the Kanaka Bar Band members (20 attended) was held to discuss the project status and prepare a list of questions and issues for submission to the EAO.

1.3.7.3 Proponent Response to Comments

As required by section 18 of the EA Act, copies of all public, First Nations and government agency submissions on the Application received by the EAO were forwarded to the proponent.

On April 25, 2001, the proponent was requested to submit information to the EAO by June 11, 2001 on any further public and First Nation's issues that arise during the Application comment period and how they proposed to address them. The Project Committee chair subsequently extended the deadline for the proponent to respond until June 15, 2001.

The proponent responded to the agency and public comments on June 13, 2001.

1.3.8 Project Committee Recommendation

On May 30, 2001, the Kwoiek Creek Hydroelectric Project Committee reviewed the comments on the Application and the proponent's responses to these comments. The Project Committee agreed that the potential effects of the project had not been adequately described, that the Application had not set out practical measures for mitigating or preventing all the significant adverse effects of the project, and that further opportunities for the public, First Nations and government agencies to comment on the project and its potential effects were required. On this basis, the Project Committee recommended that the EAO, pursuant to section 19 (1)(b), order that:

- the project undergo further review under the Project Report stage of the environmental assessment process (Division 8 of the *EA Act*); and that
- the proponent be required to prepare a Project Report in accordance with (forthcoming) Project Report specifications that the EAO, on the recommendation of the Project Committee, considers relevant for an effective assessment of the potential effects of the project.

The proponent was officially notified of this decision on July 4, 2001. A Registry Notice was issued outlining the factors that contributed to the Project Committee's recommendation.

1.3.9 Preparation of Draft Project Report Specifications

Project Report Specifications have been prepared in draft form by the Project Committee based on its review of comments on the proponent's application.

The draft Project Report specifications are being made available to the public, First Nations and government agencies for review and comment pursuant to the *EA Act*. Comments on the draft Project Report specifications will be accepted by the EAO from August 1 to August 24, 2001 (24 days). Final changes will be made to the Project Report specifications following review of any comments received on the draft Project Report specifications. The Project Committee will have 20 days to review and consider all comments provided and to issue the Final Project Report Specifications to the proponent.

1.4 Overview of Canadian Environmental Assessment Act Requirements

The Kwoiek Creek Hydroelectric Project is subject to the requirements of the *Canadian Environmental Assessment Act* (CEAA) because part of the project is located on federal Indian Reserve land and also the project will require authorizations under section 32 of the *Fisheries Act* (killing of fish by means other than fishing, in this case entrainment) and section 35.2 of the *Fisheries Act* (harmful alteration, disruption, or destruction of fish habitat). INAC is the lead responsible authority for the CEAA review, and coordinates the input of federal agencies (including DFO, EC, Health Canada, NRCan, Parks Canada and Transport Canada) into the review of the Kwoiek Creek Hydroelectric Project.

The CEAA review of the Kwoiek Creek Hydroelectric Project is being undertaken as a screening-level review. In accordance with section 16(1) of the CEAA the following factors must be considered in a screening report:

- the environmental effects of the project including the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out;
- significance of the effects;
- public comments;
- mitigation measures; and
- other matters that responsible authorities may require, such as alternative means of carrying out the project and follow-up programs in respect of the project.

CEAA requirements must be met prior to the federal government taking any action (*e.g.*, issuing an authorization or permit) on the Kwoiek Creek Hydroelectric Project proposal.

In recognition that effective co-operation on all matters of environmental concern is a shared objective of the governments of Canada and British Columbia, the Canada-British Columbia Agreement for Environmental Assessment Co-operation was brought into effect in 1997. Under the agreement, projects that require review under both the federal and provincial environmental assessment laws undergo a single environmental assessment meeting the legal requirements of both governments. The two governments agreed that federal authorities will follow BC's review process. Federal government agencies participate actively in the BC process to ensure their assessment requirements are met. Projects subject to joint federal/provincial review require approval from both levels of government before they can proceed (*i.e.*, both governments retain their respective decision making responsibilities and authority).

1.5 Concurrent Review of Provincial Permits

Under the *EA Act*, a proponent may request that concurrent consideration be given to specified approvals under other provincial government enactments. This request must be made to the EAO prior to submission of the Project Report in response to the Final Project Report Specifications.

Although the proponent has not yet formally requested concurrent review of provincial permits it is anticipated that, prior to submitting a Project Report, the proponent will request concurrent review of its water licence application with its project approval certificate application. This request must meet the requirements of section 27 of the Act for the provisions for concurrent review section 28 of the Act to be in effect, requiring the Water Management Branch to:

i) proceed expeditiously with the consideration and review of the water licence application, in accordance with the *Water Act*;

ii) inform the proponent and the Project Committee, before the referral to Ministers of the Project Report (*i.e.*, Stage 2), whether the water licence will be issued (if a project approval certificate is approved), refused or a decision postponed to a later date; and

iii) within 30 days of issuance of a project approval certificate (if approved), to issue, refuse to issue or specify a later date on which a decision would be made with respect to the water licence application.

2 Project Report Specifications

2.1 General Instructions

Pursuant to section 21 of the *EA Act*, the EAO is required to prepare Project Report specifications in draft form that identify the information, analysis, plans and other records that the EAO, on the recommendation of the Project Committee, consider relevant to an effective assessment of the potential effects of the project, and to deliver a copy of the Draft Project Report Specifications to the proponent. Section 22 and 23 of the *EA Act* outline the information that may be required in a Project Report.

The Project Report specifications comprise the full set of outstanding issues that the proponent needs to address in order for the Project Committee to make a recommendation on this project.

Not all issues of concern about a proposed project require resolution during the EA review. The EA process is undertaken on a basis for a "strategic level" government decision on whether or not to allow a development proposal to proceed, and if so, under what conditions. Some issues may be more appropriately considered during the permitting review (which follows the strategic level EA approval) or they may be beyond the scope of the EA review (*i.e.*, a feasibility analysis).

In deciding which issues are to be addressed during a project review (*i.e.*, EA level issues), the Project Committee was guided by the following principles:

- issues should only be considered if they are relevant to whether or not the project is in the public interest and should proceed;
- the EA process, as a project-specific review mechanism, is not the appropriate forum for modifying existing government policy expectations or creating new operational requirements. Thus, requirements for the proponent to perform studies or to undertake project redesign need to be determined with reference to existing government policy expectations applied more generally to developments (whether or not the latter are subject to the EA process); and
- reviews are conducted within the context of the prevailing land use planning regime. Project Committees are not expected to anticipate future changes in land use designations or to suspend project review activity while land use planning is underway.

The Project Committee notes that only issues that were not adequately addressed in the proponent's application need to be dealt with in the Project Report. The Project Committee sees no reason to duplicate and/or copy material from the Application on issues the committee has already reviewed, resolved and accepted other than for reasons of clarity.

Specification #1 – General

The following are general instructions regarding the presentation of information to be provided in the Project Report for the Kwoiek Creek Hydroelectric Project:

a) **maps, figures, graphics and tables are to be properly labelled, include appropriate legends and scales, be legible, and be of an appropriate size to display the information being illustrated. Unbound versions of key maps (preferably of the same scale) should be provided for quick reference;**
b) **units of measurement used should be consistent throughout the report;**
c) **data tables are to be complete and are to include summary statistics. Where this data is discussed or otherwise referenced in the report, the location of raw data tables should be noted. When statistically derived data are used in the assessment of effects, or to characterize sample populations, tables showing these data must also be referenced. Where appropriate, maps should be used to provide spatial context for the data and effect interpretations. Rationales for data interpretations should be explicitly stated and comprehensive;**
d) **any quality assurance/quality control data generated, including laboratory data, must be presented, interpreted and assessed;**
e) **the proponent is advised to consult with the appropriate agency or agencies before collecting data and information and before implementing methods referred to within these specifications, so that their acceptability can be reviewed;**
f) **unless otherwise specified, appropriate standard scientific methodologies such as Resource Inventory Committee Standards (RIC) are to be applied to assessments conducted;**
g) **all studies and reports are to be completed and signed off by appropriately qualified professionals, fully familiar with the required methodologies;**
h) **all project related commitments are to be listed by subject and project phase as a separate chapter or as an appendix to the Project Report; and**
i) **the Project Report should clearly indicate who takes professional responsibility for any technical studies, recommendations or conclusions. In particular, this applies to any professional engineering work that is regulated under the British Columbia *Engineers and Geoscientists Act.***

2.2 Project Proponent, Design and Consultation Specifications

2.2.1 Project Proponent

According to the Application, the proposed Kwoiek Creek Hydroelectric Project is being jointly developed by the Kanaka Bar Indian Band and Powerhouse Energy Corp. The Council of the Kanaka Bar Band has applied for a water licence to develop the hydroelectric potential of Kwoiek Creek on the west side of the Fraser River at Kanaka Bar. The Band intends to develop the project for the benefit of the member

Bands of the Nlaka'pamux First Nation. The Band has entered into an agreement with Powerhouse Energy Corp. of Vancouver as the operating partner.

Specification #2 - Proponent
The Project Report must:
a) **Provide the proper legal name of the applicant for the Project Approval Certificate; and**
b) **Clarify the arrangement between the Kanaka Bar Indian Band and Powerhouse Energy Corp for the design, construction, operation, decommissioning and abandonment of the project.**

2.2.2 Project Schedule

Specification #3 - Project Schedule
The Project Report must include an updated schedule for the submission and review of the Project Report, permitting and licensing applications and construction of the project's components. The construction schedule must incorporate and display environmental constraints (*e.g.*, reduced risk instream work windows).

2.2.3 Project Description

The project description in the Project Report will be deemed to be the final form of the project proposal for which a project approval certificate is being sought. Therefore it is important that the project description be clearly and consistently documented in the Project Report.

The following Project Report specification does not mean that the proponent is expected to provide final versions of layout plans, engineering designs or technical specifications in the Project Report. This permit level of detail is seldom necessary to complete the impact assessments required to support an informed certification decision by government. The only exceptions would be those instances where final layout and design details are necessary to resolve uncertainties about the acceptability of a specific project design component, feature or mitigation and compensation measure. Such instances are explicitly identified in the Project Report specifications.

Specification #4 - Project Description
The Project Report must include :
a) **a description, site plan, and GPS coordinates of the project and its major components including all onsite and offsite facilities associated with the project;**
b) **a description and site plan of any new, altered or expanded public works or undertakings that will be required because of the project;**
c) **a description, in general terms, of how the project would be decommissioned to ensure that there are no obstacles to decommissioning and to identify the party/parties with responsibilities for decommission. This should include the possible, although unlikely,**

event of abandonment before project completion of decommissioning in the distant future after project life. These discussions may include bonding or other decommissioning funding mechanisms.

Any changes to the proposed development, as it has been understood and reviewed to date under the EA process, must be clearly described.

If there are any modifications to the project, the proponent should contact the EAO well in advance of submitting the Project Report to ensure that the Project Report specifications do not require amendment.

2.2.3.1 Power Intake Structure

Specification #5 - Power Intake Structure

The Project Report must:

a) **Include a full assessment of impacts both upstream and downstream of the intake structure and its location, including potential for entrainment of migratory resident fish;**
b) **Demonstrate that design of the weir will not present an obstacle to fish movement in either direction at any flow;**
c) **Include an evaluation of the effects of the intake operation on bedload and large woody debris transport;**
d) **Include additional details about providing power to the intake structure and potential impacts; and**
e) **Include a preliminary description of the proposed method of construction for the intake**

A more detailed description of the method of construction for the intake will be required upon submission of final design plans to MSRM/MWLAP and DFO.

2.2.3.2 Water Conveyance System

The Application indicates that water will be diverted from the intake to the powerhouse by either a tunnel or a buried penstock. There is a range of potential impacts - including but not limited to land use disruption - that can result from construction of either water conveyance options. These potential impacts were largely not assessed in the Application.

Specification #6 - Water Conveyance System

The Project Report is to include an overview assessment of all potential environmental impacts related to both the penstock and tunnel options of sufficient detail to support the rationale for the selection of the preferred option.

2.2.3.2.1 Penstock Option

Specification #7 - Penstock Option

The following information must be included in the Project Report if the penstock option is selected:

a) **Preliminary plans showing the location of the penstock and proposed right-of-way within the Kwoiek Creek corridor as well as topographic features, streams, drainages and road alignment, and additional plans showing stream-crossing structures;**
b) **A detailed environmental assessment of all potential impacts associated with the design, construction and operation of the penstock, including (but not limited to) an assessment detailing all potential disruption to riparian habitat within 50 metres from the top of the stream bank;**
c) **A slope stability analysis;**
d) **An assessment and a plan showing the location of waste rock disposal sites;**
e) **An assessment of how drainage and stream crossings would be designed to avoid impacting water quality and fish passage;**
f) **Mitigation measures to offset adverse impacts from the construction and operation of the penstock and a description of residual impacts; and**
g) **A conceptual restoration plan for any disturbed areas including waste disposal sites.**

2.2.3.2.2 Tunnel Option

Specification #8 - Tunnel Option

The following information must be included in the Project Report if the tunnel option is selected:

a) **Detailed plans showing the location of the structure within the Kwoiek Creek corridor as well as topographic features, streams, and drainages;**
b) **Description and conceptual plan showing how waste rock is to be disposed of including the proposed location of waste rock disposal sites;**
c) **A detailed assessment of the potential impacts associated with the design, construction and operation of the tunnel;**
d) **Conceptual restoration plan for any disturbed areas including waste disposal sites; and**
e) **Mitigation measures to offset adverse impacts from the construction and operation of the tunnel, and a description of residual impacts.**

2.2.3.3 Powerhouse and Switchyard

Specification #9 – Powerhouse and Switchyard

The Project Report is to provide preliminary design plans showing the location of the powerhouse on IR4 and identify any related impacts associated with the structure, location and construction. As relevant, identify mitigation options.

2.2.3.4 Tailrace

Specification #10 – Tailrace

The Project Report is to:

a) Include preliminary design plans of the tailrace;
b) Include an assessment of channel stability in the vicinity and downstream of the proposed tailrace;
c) Clarification of how fish will use the tailrace to access the lower 3km of Kwoiek Creek; and
d) Include a fish habitat assessment for the side channel that the proposed tailrace intercepts.

If the tailrace is designed to provide fish habitat, a description of the conceptual design must be included in the Project Report.

2.2.3.5 Transmission Line

The proposed project includes a 70 kilometre 138kV transmission line connecting with the Highland valley Copper substation at Spatsum. In response to public and agency concerns regarding a new transmission line instead of connecting to the existing 500kV transmission line which passes the powerhouse site, the proponent has initiated further discussions with BC Hydro. Under consideration is the use of existing BC Hydro lines along a portion of the route that would result in shortening the new construction by approximately 20km.

The proponent is conducting a study to narrow the proposed transmission corridor from the 1.5km to 100m in width, and to avoid built up areas and homes, and to the extent possible, all privately held lands or Indian Reserves.

MOF advises of potential impacts on forest land values, access of tenure holders onto the or areas of operation or on Forest Service Roads that the transmission line crosses. Potentially impacted resource values include timber inventory affected as will as range and recreation values. Transmission corridor Option #1 would have the least impact on resource values, especially if it followed existing transportation or industrial corridors.

The development of transmission lines can result in a range of potential impacts to fish, wildlife and vegetation resources from stream crossings, clearing, maintenance activities and sedimentation during construction.

Specification #11 – Transmission Line

The Project Report is to include:

a) **An overview assessment – including but not limited to stream crossings (specify fish bearing or non-fish bearing as per the *Forest Practices Code*) – of all potential transmission line corridor options (including those involving connections to BC Hydro's existing 500 kV transmission lines) and rationale for the selection of the preferred option. The preferred corridor should have a maximum width of approximately 100 metres;**

b) **A complete impact assessment of the preferred transmission option. This is to include a description of wildlife, fisheries, vegetation (including rare and endangered species and ecosystems), forest land, range and recreation resource values, including identification of high wildlife/fish use or critical habitat and analysis of the impact of the transmission line and related construction and operational activities on these resource values;**

c) **Proposed mitigation measures to offset adverse impacts of the construction and maintenance of the transmission line;**

d) **Conceptual access management plans with a commitment to prepare detailed access management plans to be approved prior to construction of the transmission line; and**

e) **Land statusing for all properties, tenures and reserves that will be crossed by the preferred option.**

2.2.4 Public Consultation

The proponent is expected to undertake public consultation during the preparation of the Project Report and to report to the EAO on its public consultation activities. First Nations consultation requirements are specified in section 2.4.

Specification #12 - Public Consultation

The Project Report must include:

a) **An update on the public information distribution activities and consultation activities undertaken from August 2001 to the date of the submission of the Project Report. Public and First Nation information distribution and consultation is to be undertaken in communities in the vicinity of the project. In addition, the proponent is to notify all land owners, mineral and range tenure holders, Indian Bands and others whose rights may be affected by the project;**

b) **A summary of the issues identified by the public and how the proponent proposes to address these issues; and**

c) **A proposed public consultation program for the Project Report comment period.**

2.3 Environmental Specifications

2.3.1 Water Management

2.3.1.1 Water Licensing

Should the proponent wish to proceed with the concurrent review of provincial permits, the proponent should contact the Water Management Branch of the Ministry of Water, Land and Air Protection directly, and advise the EAO in accordance with section 27 of the *EA Act*.

2.3.1.2 Hydrology and Discharge Flows

The assessment of hydroelectric projects, which by their very nature use water for operation, requires a sound understanding of the area's hydrology. An accurate description of the system's natural hydrology will be required by regulatory agencies to initiate the determination of necessary fish flows in Kwoiek Creek. The maintenance of ecosystem integrity and the provision of conditions to sustain viable fish populations will be central in this determination process. It is expected that some limited flow may be diverted without compromising this integrity beyond an acceptable level. However, it is also expected that the negative impacts associated with withdrawal will increase as the amount to diversion increases and, negative impacts are likely to increase as low flows are approached. Thus, DFP advises that the approval of withdrawal during low flow periods is unlikely.

The Kwoiek system is a snowmelt/glacier melt system that provides a long freshet and period of maximum power storage. This long freshet results from the melting first of the accumulated snow, followed in late summer by melting of glacial storage. The winter precipitation system is a rain/snow hybrid in the valley bottom (more than 50% precipiration) and a winter snow system at higher elevations. The Kwoiek Creek Hydroelectric Project may be affected by climate change and the associated hydrological response.

Specification #13 - Hydrology and Discharge Flows

The Project Report is to:

a) Provide an assessment of the natural hydrograph for Kwoiek Creek including flow characteristics such as rates of change, timing, duration and frequency of discharges;

b) Provide an estimate of mean annual discharge (MAD) at the point of diversion (POD) with catchment area and in each reach downstream;

c) Provide approximate daily flows in the affected reaches below POD under regulation with an overlay of 10% and 20% MAD thresholds;

d) Provide mean, median and standard deviation of the daily and weekly discharges;

e) Provide stage change data in terms of hourly, daily, weekly and seasonal changes;

f) Provide an assessment of fish periodicity within Kwoiek Creek in relation to flows;

g) Provide an evaluation of fish passage, habitat access and riparian inundation in relation to flows;
h) Provide an evaluation of the hydrological data from the Nahatlatch system for estimating the hydrology for Kwoiek Creek (including current data from the Nahatlatch gauge);
i) Examine whether there are additional watersheds that may be appropriate for calibrating to Kwoiek Creek and a rationale for their inclusion or exclusion. Provide a map of the distribution of water gauging stations nearby the project area with an indication of EcoRegion boundaries;
j) Provide flow duration curves (daily, weekly, monthly) after consultation with fisheries agencies;
k) Provide information describing the duration and frequency of extreme intra- and inter-annual flow events within Kwoiek Creek;
l) Identify flow contributions from tributaries and groundwater or losses to groundwater, if any, to Kwoiek Creek below the intake site and fully evaluate the impact of stream diversion on remaining instream flow;
m) Include refined estimates of average year, wet year and dry year daily flows based on data available from gauging station with critical conservation flow thresholds overlaid;
n) Include an estimate of the frequency of 400% MAD;
o) After consulting with fisheries agencies, provide an assessment of how the regulated flows meet various flow standards including the Richter Flow Variability Test;
p) Describe in qualitative terms the potential effects of climate change on the hydrology of Kwoiek Creek and discuss the ramifications of climate change on project design and operation;
q) Describe the potential annual frequency and effects of an outage/tripping event on aquatic habitats including the estimated magnitude, rate of change and duration of any flow fluctuations; and
r) Describe mitigation plans to avoid impacts to aquatic habitats in the event of an outage or tripping event.

2.3.1.3 Ice Regime

Formation of frazzle ice can have detrimental impacts to aquatic life. The proposal to change winter flows in the 10 kilometre bypass section may alter the local ice regime. The Application indicates that no ice was observed in the winter of 2000/01 between the hydrometric station and the mouth of Kwoiek Creek. It is further stated that the potential for icing due to a reduction in flow is considered to be low as the power plant is expected to operate only rarely (very high flow years) when the flow is at or exceeds 1.6 m^3/second during the coldest months of the year (Page 5-11 of the Application).

Specification #14 – Ice Regime

The Project Report is to include:

a) **A more detailed description of how the winter ice regime would respond to the flow diversion proposal under a variety of typical winter temperature regimes;**
b) **Additional information on the operation of the plant in winter months in low flows, the potential for ice formation and the potential impacts of changes to aquatic habitat; and**
c) **Avoidance and, or mitigation opportunities as required.**

2.3.2 Water Quality

2.3.2.1 Water Quality Monitoring Program

Specification #15 – Water Quality Monitoring Program

The Project Report is to include a commitment to develop, obtain approval from MSRM/MWLAP and DFO and implement, a water quality monitoring program (WQMP) for the pre-construction (baseline), construction and operational phases of the project. The WQMP and baseline construction information will need to be completed and approved by MSRM/MWLAP and DFO prior to commencing construction of any works related to the project.

The water quality monitoring program should include but not be limited to the following:

a) **Provide specifics on frequency and location of sampling;**
b) **Conduct site specific monitoring for a minimum of one year prior to construction (baseline) and for a sufficient period post-construction to meet the monitoring objectives;**
c) **Provide all relevant historical water quality data to assist in placing the monitoring data collected into perspective;**
d) **Identify automated water quality monitor control sites. The automated sampling probes should have the capability to measure temperature, turbidity, dissolved oxygen and conductance. Propose a sampling frequency protocol (with supporting rationale) for the variables;**
e) **Analyze grab samples from each site for turbidity, conductance, total suspended solids (TSS), pH, temperature, nutrients and major ions. Include additional, less frequent monitoring for metals, petroleum hydrocarbons and fecal coliform bacteria as required;**
f) **Measure TGP, and temperature in the river at the time of sample collection;**
g) **Undertake additional monitoring as required to address specific issues such as instream work, runoff from spoil piles or waste rock dumps, spills, landslides, nitrates from the use of explosives or other unforeseen problems;**
h) **Monitor benthic invertebrates including collection of a baseline data set. A possible monitoring method, which may be applied with some modification, is the Index of Biological Integrity. Baseline data collection and monitoring**

is to be conducted at approximately the same sites used for water and sediment quality sampling;

i) If the project results in the deterioration of water quality in Kwoiek Creek, the proponent will need to develop a mitigation plan in consultation with MSRM/MWLAP and DFO; and

j) Quality assurance and quality control checks.

2.3.2.2 Temperature

The Ministry of Water, Land and Air Protection agrees that the project has the potential to alter water temperatures in Kwoiek Creek by diverting water through an enclosed conveyance structure and by reducing flows in the 10km stream section between the intake and the tailrace.

Specification #16 - Temperature

The Project Report is to:

a) Update the listing of temperature tolerances for fish species potentially affected by the project. Ensure information accurately reflects thresholds by using direct empirical evidence, expert opinion, BC literature review and local anecdotal knowledge;

b) Provide a quantitative assessment of the predicted temperature changes due to the project and any biological impact associated with any change based on an appropriate published temperature-flow model in consultation with MSRM/MWLAP and DFO. Completed data fields are to be included in the final report. The assessment is to include (but not be limited to) the following:

i) a focus on recent conditions of summer/winter low flow events, using 1 and 7 day low flow data as a base;

ii) identification of lethal and sublethal effects on all fish species potentially affected by the project, for all life history stages, fish sizes and acclimation temperatures. Examples of factors to be considered include displacement of fish from preferred habitats (*i.e.*, Bull trout), dissolved oxygen, TGP, parasites, disease and behaviour/growth change; and

iii) identification of the effects of temperature regime changes on primary and secondary production and the resultant impact on fisheries.

c) Identify structural or operational measures to mitigate adverse temperature effects and an assessment on the likely effectiveness of each mitigation measure;

d) Include a commitment to develop and implement a detailed water temperature monitoring program as part of the Water Quality Monitoring Plan. The program is to be developed with input from MSRM/MWLAP and DFO and is to:

i) be conducted for a minimum of one year prior to construction, during construction and throughout the operation of the project;

ii) evaluate temperature changes for a period representative of a wide range of flow conditions;

iii) describe in sufficient detail to provide assurance that the data collected will be adequate to identify the magnitude, frequency and duration of any temperature change;

iv) propose mitigative measures to ensure no fish mortality and/or harmful alteration, disruption, or destruction of fish habitat due to temperature effects associated with the project; and

e) Include an analysis of the temperature data that would allow DFO to determine whether a harmful alteration, destruction or disruption of fish habitat (HADD) is likely to occur as a result of temperature increases. The Project Report should include all raw temperature data. The proponent must contact the fisheries agencies to discuss and confirm the temperature-monitoring program to provide assurance of the ability to prove/disprove a temperature HADD.

2.3.2.3 Total Gas Pressure (TGP)

Total gas pressure (TGP) is a factor that can induce lethal and sublethal effects in fish. A more detailed prediction of TGP is required.

Specification #17 - Total Gas Pressure (TGP)

The Project Report is to:

a) Describe baseline TGP conditions during a variety of flow conditions and plant operation scenarios;

b) Predict changes in TGP for a representative range of plant operation scenarios. The guide *BC Environment water quality criteria for TGP to protect aquatic life, 1997* is to be referenced and committed to when determining TGP levels for this project; and

c) Identify and commit to mitigation measures if adverse effects from the project are predicted or observed.

2.3.2.4 Sediment and Bedload

There is potential for the release of suspended sediments through construction related activities and after construction through maintenance of the intake structure. The proponent has identified a number of mitigation techniques to minimize sediment introduction during construction including the scheduling of work in lower flows.

Specification #18 - Sediment and Bedload

The Project Report is to:

a) Identify the potential for sedimentation from construction and operation, and related mitigation;

b) Refer to the guide: Singleton, H. J. 1985, *Water quality criteria for particulate matter.* Resource Quality Section, Water Management Branch, MELP. This

document is to be referenced and committed to when determining particulate matter levels for this project;
c) Provide additional information on proposed sediment management, including flushing of the sediment chamber. Alternative methods for sediment removal should be identified and assessed;
d) Include insitu measurements of turbidity (NTU) in addition to suspended solids. Regulatory agencies require that a regression be developed for these two measures;
e) Predict the impact of the weir on suspended sediment transport and insect drift; and
f) Commit to prepare an erosion, sediment and drainage management plan for all clearing and site preparation work, waste dumps, road building and construction of a water conveyance system for review and approval by MSRM/MWLAP and DFO prior to the start of construction. This plan will be a component of an Environmental Management Plan (EMP).

2.3.2.5 Settling Ponds

Specification #19 - Settling Ponds
The Project Report is to:
a) Include conceptual plans and locations for settling ponds, such as those that may be required at spoil sites;
b) Include an assessment and report on the habitat capability of pond locations relative to habitat for plants and animals including rare and endangered species/communities; and
c) Propose measures to mitigate adverse impacts to habitat where these facilities may be located.

2.3.2.6 Blasting

Blasting using nitrate-based explosives will be required during construction of the intake structure, penstock and powerhouse. Blasting activities can present a water quality concern through deposition of nitrogen residues in the drainage water in the tunnel and in other construction areas subject to blasting. Increased sedimentation can also occur as a result of blasting activities. Sediment control measures must be in place to minimize impacts during blasting and until disturbed areas have been stabilized.

Specification #20 - Blasting
The Project Report is to:
a) Include a commitment to prepare and submit for approval to MSRM/MWLAP and DFO during final design, a detailed drilling and blasting plan;
b) Include a commitment to comply with the *Guidelines for the use of explosives in or near Canadian Waters, 1998;*
c) As part of an overall water quality-monitoring program, commit to testing tunnel drainage and waste rock dump runoff for the following parameters:

ammonia (NH_3), nitrite (NO_2), nitrate (NO_3) and pH, temperature and turbidity;

d) Include an assessment of impacts from blasting activities on wildlife. Identify mitigation measures to prevent or reduce impacts to an acceptable level. Include a commitment to monitor impacts of blasting activities on wildlife; and

e) Include a commitment to submit final plans for blasting to NRCan for consideration under the *Explosives Act*.

2.3.2.7 Metal Leaching/ Acid Rock Drainage (ML/ARD)

The project has the potential to generate significant volumes of waste rock that should be evaluated for acid rock drainage.

Specification #21 – Metal Leaching/Acid Rock Drainage (ML/ARD)

a) To better understand the geological features of the project area, the Project Report is to include maps and a written description of the bedrock and surficial geology of the site and surrounding areas to the level of detail possible without disturbing the area. Mapping and description should include hydrology, groundwater, areas of potential metal leaching and acid rock drainage, slope stability, faulting, seismic activity, mass wasting and flood hazards.

b) The Project Report is to include an assessment of the potential for ML/ARD, based on the following Provincial guidelines:

- **DRAFT Guidelines for the Identification of Materials with a Potential to Produce Significant Metal Leaching or Acidic Drainage for Non-Mining Activities; and**
- **Guidelines for Metal Leaching and Acid Rock Drainage at Minesites in British Columbia.**

2.3.3 Fish and Fish Habitat

2.3.3.1 General

A complete assessment of fish and fish habitat potentially impacted by the proposed project is required to identify those species and habitats present, confirm the identified species' presence through studies and surveys, and assess the significance of any potential negative impacts on those species and habitats.

Specification #22 - Fish and Fish Habitat (General)

The Project Report is to:

a) **Prepare fish periodicity/life history tables (in accordance with Water Use Planning (WUP) template) for all species likely to be impacted by the project. The tables are to include all essential life history timing including migration, spawning, incubation, rearing and over-wintering;**
b) **Identify critical spawning habitat areas and key migration times and pathways to and from critical habitats such as spawning or overwintering areas;**
c) **Provide detailed habitat mapping for the areas in the vicinity of the intake and tailrace, and map/air photo-based habitat mapping for the remaining affected stream reaches;**
d) **Identify important rearing habitats for each species and life stage;**
e) **Include a complete assessment of the project structures, construction and operational activities on fish and fish habitat for all life stages, including the potential for entrainment. This should include fish passage to tributaries, side channels, and seasonal and ephemeral channels. Assess the significance of any potential negative impacts on the species and affected habitats;**
f) **Propose mitigation measures to avoid and reduce impacts on fish migration including adult and juvenile life stages which may be predicted to occur as a result of the project;**
g) **Propose mitigation measures to reduce impacts to fish habitat predicted to occur as a result of the project. In considering mitigation/compensation opportunities, it should be noted here that the MSRM/MWLAP considers the CPR barrier as a temporary obstruction; and**
h) **Indicate a commitment to undertake a post-construction fisheries monitoring program. Details of the program should be discussed with the MSRM/MWLAP and DFO.**

2.3.3.2 Red and Blue Listed Fish Species

Bull trout are present in the Kwoiek Creek watershed and are blue listed.

Specification #23 - Red and Blue-Listed Fish Species

The Project Report is to include an assessment of the effects of the project on red or blue listed species and regionally significant species. The Project Report should identify:

a) Presence, relative abundance, life history, habitat requirements and tolerance thresholds on red-listed, blue-listed, and regionally specific species. Information is to be obtained through a field program, which is supplemented by local knowledge, expert opinion, and information from similar systems in BC;
b) Potential impacts that the project may have on these species; and
c) Mitigation measures and their predicted effectiveness to reduce impacts.

2.3.3.3 Ramping Rates and Stranding Potential

Run of the river facilities can cause downstream flow fluctuations or even dewatering as a result of flow shutdowns, start-ups, powerhouse/line outages and intake failures etc. The Project Report should indicate how each of these situations will be avoided and mitigated if required. Additional information on ramping rates and stranding risk are required in the Project Report.

Specification #24 - Ramping Rates and Stranding Potential
The Project Report is to:
a) Provide a full and complete assessment on the potential effects of flow fluctuations on fish and aquatic habitat including the potential for fish stranding and the de-watering of redds. The assessment must consider annual project start-up and shutdown and emergency shutdowns in the event of line outages, mechanical failure or other factors causing outage;
b) Identify mitigation measures to reduce impacts of flow fluctuations to fish and other aquatic life (*e.g.*, flow bypass structure, flow ramping rate to prevent stranding of fish);
c) Describe and give rationale for proposed ramping rates and compare to natural stage change. Describe capabilities of the facility to meet or exceed those rates during normal operations; and
d) Provide a commitment to establish a permanent transect immediately upstream and downstream of the project to act as a control point for ramping.

2.3.3.4 Entrainment

Fish that enter the intake channel can potentially be impacted by impingement on the trash rack and entrainment into the penstock and turbines. Entrainment into Pelton turbines causes very high mortality to fish. The Application does not provide details as to what the impact of the intake structure will be on fish and how any impacts will be mitigated.

Specification #25 - Entrainment
The Project Report is to:
a) Provide an assessment of potential fish entrainment (partly based on fish species life history and migratory traits). The assessment should consider factors such as fish species composition, density estimates in the zone of

influence of the intake and the seasonal variation, potential entrainment as a function of plant operation, and net annual entrainment rates; and

b) Present a combination of mitigative measures (*e.g.*, behavioural barriers, screening, operational procedures, design features (including turbine type)) to avoid entrainment and/or compensation measures (at an advanced conceptual level) to offset all entrainment losses.

2.3.4 Wildlife, Wildlife Habitat and Vegetation

2.3.4.1 General

The Application indicates that there are potentially a number of wildlife species that may inhabit the project area, including the transmission line route. Species include mountain goats, grizzly bear and the red-listed spotted owl. Further assessment of impacts associated with the construction and operation of the project on wildlife and wildlife habitat must be conducted and documented in the Project Report.

Specification #26 - Wildlife, Wildlife Habitat and Vegetation (General)
The Project Report is to:

a) Include an assessment of project impacts of project structures, construction and operational activities on wildlife species on the project area;
b) Identify inventory methods for the wildlife surveys; and
c) Identify conceptual mitigation measures to avoid or minimize impacts to wildlife from the construction and operation of the project. Include a commitment to submit final wildlife mitigation plans to MSRM/MWLAP for approval prior to start of construction and to implement these plans as required.

2.3.4.2 Red and Blue Listed Species

The Application identifies a list of rare vertebrates that may inhabit the Lillooet, Kamloops and Merritt Forest Districts. The Application states that there may be several species which utilize habitats within the project area. Species of concern include but are not limited to: Rubber Boa, Racer, Gopher Snake, Western Rattlesnake, Prairie Falcon, Flammulated Owl, White-throated Swift, Lewis's Woodpecker, Fringed Myotis, Western Small-footed Myotis and Spotted Bat. Construction of a transmission line corridor through grassland and dry forest areas could have serious impacts to several blue listed species in the area. The Kwoiek creek corridor may provide important habitat for blue listed bat species. Changes to insect production in the 10 km bypass section could affect bat feeding success.

Specification #27 - Red and Blue Listed Species
The Project Report is to:

a) Include an assessment of the impacts of the project on rare species in the project area;
b) Identify species presence and critical habitats in consultation with MSRM/MWLAP for the preferred transmission line;
c) Identify a mitigation plan for any species determined to be potentially impacted by the project;
d) Provide, in consultation with MSRM/MWLAP, the terms of reference for a post construction monitoring program for any rare species in the project area; and
e) Commit to reporting any rattlesnake sightings and to ensuring that crews do not harm snakes found during construction activities.

2.3.4.3 Northern Spotted Owl (Red Listed)

The intake site and powerhouse site may provide critical habitat for the red-listed spotted owl that depends on old growth forests habitat. Additionally, traffic and construction activity may have negative impacts on spotted owl in the area, including disruption to the nesting period.

Specification #28 - Northern Spotted Owl
The Project Report is to:
a) Provide a detailed impact assessment of all aspects of the project on spotted owl;
b) Following discussions with the MSRM/MWLAP, include a detailed mitigation plan; and
c) Include more detailed information on the footprint of the water intake structure and other project structures prior to defining clearing boundaries in this area. The proponent must minimize clearing activities.

2.3.4.4 Harlequin Duck (Yellow Listed)

Kwoiek Creek may provide habitat for breeding Harlequin Duck, including stretches within and above the project area.

Specification #29 - Harlequin Duck
The Project Report must include:
a) Pre-construction breeding (pair) and productivity (brood) survey assessments of Harlequin Duck to be undertaken for the project area of the creek in accordance with RIC survey standards (Inventory Methods for Riverine Birds: Harlequin Duck, Belted Kingfisher, and American Dipper, Standards for Components of British Columbia's Biodiversity No. 12, March 1998);
b) An assessment of the potential adverse impacts of construction and operation of the project on Harlequin Duck;
c) Following discussions with CWS, include mitigation and/or compensation measures to prevent or reduce effects to an acceptable level; and
d) Commit to monitor the effects of project operations if required by CWS.

2.3.4.5 Mountain Goats

The Application reports that mountain goats winter on the upper slopes along Kwoiek Creek but do not inhabit the valley bottom. It is acknowledged that construction and operational activities associated with the proposed facility could disturb these over-wintering populations.

Specification #30 - Mountain Goats
The Project Report is to:
a) Include a full year goat use inventory. The goat use inventory must be expanded beyond the lower slopes of the Kwoiek valley to that area in which

goats summer above the intake structure and their winter range. The proponent is required to identify and track these animals through their respective ranges for a full year cycle. The proponent must consult with MWLAP prior to the initiating this study;

b) Include a goat population inventory so that the long-term impact of the project on goat populations can be assessed;

c) Provide an annotated outline of an environmental monitoring plan for the construction phase of the project. This plan should include measures to eliminate disturbance to mountain goats from winter and summer access/construction activities including blasting;

d) Provide a commitment to complete, submit and obtain approval prior to the start of construction for a goat monitoring plan during construction; and

e) Include a commitment to undertake construction and post construction monitoring of goat populations.

2.3.4.6 Grizzly Bears

The Application notes that grizzly bear may occasionally use habitats near the proposed intake. It is the Ministry's opinion that the proposed Kwoiek Creek Hydroelectric Project has the potential for minor direct and cumulative impacts to the Threatened Stein-Nahatlatch grizzly bear population and, depending on the routing of the transmission line, minor (Options #1 and #3) to moderate (Option #2) impacts to the threatened North Cascades grizzly bear population.

The following Project Report specifications are provided to outline the information that should be collected to guide the development of mitigation measures, to inform the decision on project certification and to serve as the baseline for any monitoring.

Specification #31 - Grizzly Bears

The Project Report is to include:

a) Information on sightings of grizzly bears and permanent and semi-permanent sign (rub trees, dens, etc.) through interviews with BC Parks staff, ministry Conservation Officers and others in the area as well as a reconnaissance of the area within 500m of the intake, penstock or tunnel and powerhouse. MSRM/MWLAP will provide a list of contacts for interviews. From the results of interviews, habitat maps and reconnaissance of the project area and adjacent areas, map any existing grizzly bear dens, foraging areas and movement routes, if found;

b) Terrestrial ecosystem mapping (TEM) at the 1:5,000 scale according to RIC standards, for the area within 500m of the intake, penstock or tunnel and powerhouse to determine habitat losses and/or reduction in effectiveness attributable to the construction and operation/maintenance of the project;

c) Provide interpretation of habitat capability/suitability for grizzly bears. Direct and indirect effects of the project on habitat suitability, human disturbance and habitat displacement should be documented in the Project Report;

d) If Option #2 is the preferred option for the transmission line, complete TEM at the 1:20,000 scale, for the area within 500m on either side of the proposed Option #2 transmission line right-of-way (only for the portion within the North Cascades Grizzly Bear Population Unit). The methodology for the mapping will be established in consultation with MSRM/MWLAP;
e) Where the habitat suitability/capability mapping demonstrates that the project would directly impact grizzly bear habitat, propose suitable off-site mitigation measures. Conceptual mitigation measures should be developed in consultation with MSRM/MWLAP. Final mitigation plan will need to be approved by MSRM/MWLAP prior to the initiation of construction; and
f) Plans to evaluate and monitor the effectiveness of mitigation measures for implementation if the project proceeds, including adaptive management to allow modification of such measures and actions to increase their effectiveness, based on experience with the program.

2.3.4.7 Wildlife Trees

Wildlife trees, if present, are a key habitat element and component of provincial biodiversity objectives. The Application states that high value wildlife trees may be uncommon in the proposed transmission line corridor options due to previous disturbance or the presence of sagebrush-grassland. It was further noted that no large raptor nests were observed near the powerhouse. Information is lacking in the Application on presence, location, and potential impacts resulting from the project on wildlife trees.

Wildlife trees identification and plans for protecting wildlife trees may have implications for wildlife tree patches or wildlife tree retention under provincial landscape unit priority biodiversity objectives.

Specification #32 - Wildlife Trees
The Project Report is to:
a) Identify wildlife trees in or near areas to be disturbed by the project. This is to include the identification of typical features: raptor nesting sites, cavity nesting sites, roosts/habitat for small animals. It is recommended that this assessment be conducted by an individual who has completed the "Wildlife/Danger Tree Assessment Course" and the "Stand Level Biodiversity Course"; and
b) Provide plans for protecting wildlife trees and/or compensating for project related impacts. This must include a schedule demonstrating that tree falling will not disturb nesting birds.

2.3.4.8 Plant Species and Plant Communities

The construction of the intake structures, water conveyance structure, powerhouse, access roads, distribution lines and clearing associated with the construction of the transmission line, can result in negative impacts to plant and plant communities. The issue of invasive weeds can be of particular concern. The Application indicates that

there are a number of rare vascular plants that may be found within the project area. A further assessment of potential impacts from project development on this resource is required.

Specification #33 - Plant Species and Plant Communities
The Project Report is to:

a) **Include an assessment of project development on vegetation resources within the project area, including rare or endangered plant communities;**
b) **Provide clarification on the plant inventory methods used in the Application;**
c) **Identify/map all vegetated areas which will be affected by the project. Include areas which will be directly affected (*i.e.*, construction, road, disposal, compensation/enhancement sites); and**
d) **For areas to be impacted by the project, identify existing plant communities including rare and endangered plants and plant communities, the significance (*i.e.*, ecosystem function) of plant species within those communities;**
e) **For sites that will be indirectly impacted, identify the mitigation measures to eliminate or reduce adverse impacts;**
f) **Include conceptual restoration plans and vegetation management strategies prepared in consultation with MWLAP and local First Nations with respect to the selection of appropriate species. Commit to finalize and implement restoration plans and vegetation management strategies to be approved by MSRM/MWLAP prior to completion of project construction; and**
g) **Identify weed control strategies/plans and provide a commitment to adhere to these during construction and operation of the project.**

2.3.4.9 Noise: Potential Wildlife Displacement

Noise from project activities can result in animal displacement or other behavioural responses.

Specification #34 - Noise: Potential Wildlife Displacement
The Project Report is to:

a) **Provide a general schedule for all construction activities which will reduce or avoid impacts to the species identified through the wildlife impact assessment (*e.g.*, blasting, tree falling/nesting birds, transmission line installation, maintenance); and**
b) **Include plans for construction and operation noise abatement measures for the project.**

2.3.4.10 Migratory Birds

The potential for bird kills due to new transmission lines is a concern for CWS. The use of deflectors and vertical dampners may reduce to some extent the potential for strikes, and therefore should be considered as potential design measures where the transmission line crosses the Fraser and Thompson Rivers.

The proponent should be aware of Section 35(1) of *Migratory Bird Regulations* under the Migratory Bird Convention Act which states that "…no person shall deposit or permit to be deposited oil, oily wastes or any other substances harmful to migratory birds in any water or any area frequented by migratory birds."

Specification #35 - Migratory Birds
The Project Report is to:

a) **Include seasonal bird surveys of the project area, in particular any potentially useable habitat which is likely to be impacted by the development;**
b) **Identify how the project will avoid any impacts or violations of the *Migratory Bird Convention Act*, for example through timing or route selection;**
c) **Propose measures to mitigate bird species or habitats that may be adversely impacted by the project. This is to include appropriate measures to minimize electrocution and entanglement of birds in transmission lines (not limited to only migratory birds) and a commitment to avoid removal of vegetation used by bird species for nesting during the typical spring and early summer nesting season; and**
d) **Report on the possibilities for design and implementation of habitat enhancement to compensate for permanent habitat loss.**

2.3.5 Cumulative Environmental Effects

Consideration of cumulative effects that are likely to result from the Kwoiek Creek Hydroelectric Project in combination with other projects or activities that have been or will be carried out is required under the federal CEAA legislation. Government agencies have determined that the direct environmental effects of the project require further assessment, therefore an updated cumulative effects assessment will be required.

Specification #36 – Cumulative Environmental Effects

a) **The Project Report is to include an updated cumulative environmental effects (CEE) assessment based on new information on the project's potential direct effects on water quality, fish and fish habitat, wildlife, wildlife habitat and vegetation. The CEE assessment is to follow the format provided in the Canadian Environmental Assessment Agency publication Cumulative Effects Assessment Practitioners Guide (available at www.ceaa.gc.ca).**
b) **The CEE assessment is to include a summary matrix of the various impacts anticipated and their potential interaction with other projects and activities. For example, identify the potential cumulative effects of changes in water quality resulting from the project and forest harvesting activities and access roads. Another example is the loss of habitat due to clearing the selected transmission line corridor and other habitat losses resulting from other projects (e.g., roads, pipelines, etc.).**

2.3.6 Environmental Management Plan (EMP)

An environmental management plan (EMP) is a comprehensive document that sets out the measures, to be implemented during the construction of all components of the project, to minimize adverse environmental impacts. It also includes a description of construction and operational monitoring programs that will be carried out, and a description of measures such as, but not limited to, timing restrictions, contingency plans (wet soil, water erosion, siltation of water courses, spills and fire).

A conceptual outline of the EMP is required for the Project Report. If the project is approved, the EMP must be completed by the proponent and approved by relevant agencies prior to construction

The proponent will be required, as a condition of any project approval certificate, to retain an independent qualified environmental monitor(s) to ensure implementation of the EMP throughout all stages of project construction. The proponent would be expected to develop terms of reference for these positions for review by MSRM/MWLAP, DFO, and INAC for approval.

The proponent should be aware of Section 36(3) of the *Fisheries Act* administered by Environment Canada. Irrespective of other regulations or approvals, it is illegal to discharge, and ultimately the proponent's responsibility to prevent the discharge of deleterious substances, including fuel, lubricants, sediment-laden water, or contaminated water from sources (including any contamination arising because of road construction or blasting) into fish bearing waters. Accordingly, the proponent should pay careful attention to spill prevention and to the management of water, whether arising directly from their activities or indirectly through changed drainage or water contact with potential metal leaching or acid-generating rock.

The Environmental Monitor(s) would be required to have the authority to cease activities temporarily where unacceptable environmental events occur, or may be about to occur, such as situations where fish or fish habitat may be at risk (the conditions under which this individual would have the authority to stop all construction work would be established by the appropriate agencies).

Specification #37 - Environmental Management Plan (EMP)

a) The Project Report is to include a conceptual outline for the Environmental Management Plan (EMP) for both the construction and operational phases of the project. Components of the EMP include but are not limited to the following:

i) environmental surveillance and monitoring;
ii) spill contingency planning;
iii) blasting management plan;
iv) deposition of waste rock, reclamation of spoil areas;
v) sediment and drainage management plan;
vi) waste management plan;
vii) site restoration plan;

viii) noxious weed control plan; and
ix) management measures to control acidification if acid generating rocks are encountered.

b) Documentation must state clearly as to which component applies to construction or operational phases of the project or both.

c) For both construction and operations phases of the project, the proponent must commit to meeting the following regulations and guidelines, where applicable. Applicable regulations must be identified in the EMP.

i) The proponent must commit to develop, prior to construction, contingency plans that must meet Emergency Planning for Industry (CAM/CSA-Z731-M91) in conjunction with the BC Environment Guidelines for Industry Emergency Response Contingency Plans as a minimum;

ii) The proponent must adhere to the CCME Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products (1994), CCME Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products (1993), the BC Fire Code (latest version) for all fuel and chemical storage and handling facilities, and the MSRM/MWLAP Summary of Environmental Standards & Guidelines for Fuel Handling, Transportation and Storage;

iii) Indian Reserve Waste Disposal Regulations;

iv) All spills of hazardous materials must be immediately reported to Environment Canada Emergencies ((604) 666-6100) and/or the Provincial Emergency Program (1-800-663-3456);

v) If there is significant fuel or chemical storage at the site, the proponent should adopt a written fuel and chemical management plan which includes and auditing program; and

vi) Stormwater treatment from any fuelling areas should be designed in accordance with the Land Development Guidelines for the Protection of Aquatic Habitat.

2.3.6.1 Construction Monitoring Requirements

Specification #38 - Construction Monitoring Requirements

The Project Report is to:

a) Indicate a commitment to retain a qualified independent environmental monitor to provide environmental oversight of this project while it is being constructed. The credentials of this individual must be discussed and approved by MSRM/MWLAP, DFO and INAC; and

b) Include a commitment to submit environmental reports directly to the MSRM/MWLAP, DFO and INAC every two weeks and "incident" reports directly to the the same agencies within 24 hours.

2.3.6.2 Accidents and Malfunctions

Section 16(1) (a) of CEAA requires that a proponent provide information on the environmental effects of any potential accidents or malfunctions which may occur in connection with the project and assess the significance of these effects. Mitigation measures to deal with any accidents or malfunctions and contingency plans for managing the environmental effects of any potential accidents or malfunctions in connection with the project must also be described.

Specification #39 - Accidents and Malfunctions
The Project Report is to provide an assessment of the environmental effects of any potential malfunctions or accidents that may occur in connection with the project, including (but not limited to) those specifically with respect to:

a) The transport of goods which are potentially harmful to the environment (*e.g.*, petroleum products, special wastes or other hazardous materials) to and from the development by road;
b) Waste management at Kwoiek Creek Project (including solid and liquid waste disposal); and
c) Any other project component or system which has the potential, through accident or malfunction, to adversely affect the natural environment.

2.3.6.3 Post Construction Monitoring Requirements

Specification #40 - Post Construction Monitoring Requirements
The Project Report is to identify post construction monitoring requirements for critical plants, fish and fish habitat and wildlife and wildlife habitat impacted by the project. The monitoring program is to include, but not limited to the following:

a) A commitment to prepare, submit and obtain approval (from the relevant agencies). A separate construction-monitoring program for each relevant discipline issue prior to the initiation of construction;
b) Monitoring sites are to be set up in conjunction with MSRM/MWLAP staff, and are to be developed using the RIC manual – Procedures for Environmental Monitoring in Range and Wildlife Habitat Management, 1996;
c) Species and habitats at risk, ungulates, wildlife trees, and migratory bird mitigation and restoration activities;
d) Identify the appropriate methodology/type and frequency for monitoring the adverse impact;
e) Identify the duration of monitoring adequate to ensure that mitigation and restoration measures are successful;
f) Consider monitoring needs appropriate for the species being monitored, the impacts of construction/operation and the type of restoration activity; and
g) A commitment to undertake additional mitigation if results from monitoring indicate that this is warranted.

2.3.7 Greenhouse Gases (GHG)

As a hydroelectric project, this proposal will help reduce Canada's greenhouse gas (GHG) emissions from power production. The Government of Canada has not yet formulated a GHG trading policy, which when completed, will establish the methodology for determining such emission reductions. In general terms, the potential GHG emission reduction is the best possible estimate of the GHG emission that would have occurred in the absence of the project.

Optimizing the use of EcoSmart™ or high-volume flyash concrete (HVFC) in a project requiring significant volumes of concrete may provide an emportant opportunity to reduce GHG emissions that result from the use of concrete as a construction material. Every tonne of cement produced generates approximately one tonne of CO_2. Utilizing HVFC technology can reduce CO_2 emissions by almost one third, and also saves considerable energy.

Specification #41 – Greenhouse Gases (GHG)
The Project Report should describe how the project will:

a) Test its estimates of greenhouse gas emission reduction, for example, by participating in the Greenhouse as Emission Reduction Trading Pilot; and
b) Contribute to the reduction of GHG emissions, for example, through the use products (*e.g.*, EcoSmart concrete) and activities (*e.g.*, hydroelectric generation).

2.4 Cultural & Heritage Specifications

2.4.1 Archaeological Resources

The Application lacks sufficient information to meet the requirements of Section 7(2)(b), (f) and (g) of the *Environmental Assessment Act* (EAA) for archaeological resources. Additional information is required on the level of project effects on archaeological resources, subject to the *Heritage Conservation Act* (HCA), and on the measures to be taken to prevent or mitigate such effects. To meet these requirements will require completion of an archaeological impact assessment (AIA) conducted under a Section 14 Heritage Inspection Permit. An application for a HCA permit to conduct the AIA will be referred to all potentially affected First Nations having an asserted interest in the study area for comment on the assessment methodology.

The Application provides baseline documentation with respect to existing data on known sites that may be affected. Sites include a winter village (EaRj 66) located within the area of the proposed powerhouse and substation on Whyeek I.R. 4. Thirty-eight other sites are in close proximity to the preferred transmission line corridor (Option 1). As noted in the report, most of the existing site records are poor and incomplete.

Section 9 of the Application, *Continuing Studies*, includes a commitment for undertaking further archaeological studies to meet EAA information requirements. These studies need to be completed prior to making a recommendation on project approval.

Specification #42 - Archaeological Resources
The Project Report must include an Archaeological Impact Assessment (AIA) for all related project facilities and activities which:

a) **describes the nature, significance and full areal extent of archaeological resources in potential conflict;**
b) **defines the scope and magnitude of project impacts; and**
c) **provides management recommendations to address identified conflicts with protected archaeological sites.**

2.4.2 Project Effects on First Nation Interests, including Traditional Activities

Both the federal and provincial governments are responsible for ensuring that the government's legal obligations to consult with First Nations are fulfilled. These include statutory obligations spelled out in the *EA Act*, as well as constitutional obligations to not unjustifiably infringe upon Aboriginal or treaty rights. In practice, the responsibility for identifying and addressing these impacts is shared between the EAO, Project Committee members, First Nations and the proponent. In order for the proponent to fulfil the obligations of identifying and addressing potential adverse impacts of the project on First Nations and the potential project-related effects on the traditional activities of First Nations, the proponent is expected to continue consultations with First Nations during the preparation of the Project Report.

Specification #43 - Potential Effects on First Nation Interests, including Traditional Activities
The Project Report is to:

a) **Identify any adverse impacts on First Nation interests including the nature and location of any traditional customs, practices or activities that are carried out in the proposed project area (*e.g.*, traditional fishing stations, hunting, gathering, and spiritual activities that take place on Kanaka Bar IR 4 (Whyeek));**
b) **Detail measures to prevent or mitigate any adverse impacts on any First Nations' interests identified in (a) above;**
c) **Provide a clear response to each of the concerns expressed during the May 22, 2001 General Meeting of the Kanaka Bar Indian Band membership. Other sections of the Project Report may be cross-referenced to provide further details as appropriate, however, this section must be written for distribution as a stand-alone response to the concerns of the Band;**
d) **Provide an update on First Nations information distribution activities and consultation activities undertaken from August 2001 to the date of submission of the Project Report, and a summary of the issues identified and how the proponent proposes to address them; and**
e) **Propose a First Nations consultation program for the Project Report**

comment period.

2.5 Socio-Economic Specifications

2.5.1 Project Impacts and Benefits

The direct labour force requirements during the construction phase of the project are estimated at 100 full time construction jobs generating 200 person-years of employment. The bulk of the construction labour force will be drawn from the Fraser Canyon Indian communities and from Lytton, Boston Bar, North Bend and Spences Bridge. The construction phase also will result in an increase in employment in the regional service industry.

Total construction costs of $80-90 million are estimated for the project over three years. Of this total, $15 million is expected to be expended through local contractors and $45 million through specialist contractors and consultants. Of the total expenditures, $45 million represents wages and salaries and $35 million represents materials and supplies. While much expenditure will occur outside the area due to the specialized nature of a hydroelectric project, the objective will be to maximize benefits to local businesses in general and to local First Nations in particular.

The work force required to operate and maintain the completed hydroelectric facilities is estimated at approximately six full-time employees. Priority will be given to identifying and training potential employees from First Nations communities. Some maintenance items such as line repairs and clearing of the transmission line right-of-way likely would be contracted out to local contractors. Once operational, about $500,000 per year will be spent in these areas for ongoing operation and maintenance. However, estimates of payments to the Province 9including water rentals) as well as project contributions to First Nations bands and local government were not included.

Specification #44 - Project Impacts and Benefits

The Project Report must include:

a) Updated estimated of construction costs and employment for the project (based on the preferred options for water diversion, transmission line route and powerplant capacity); and

b) Estimates of annual water rental and other payments to the Province, local governments and First Nations during construction and ongoing operation of the project.

2.5.2 Recreation and Tourism Effects

During the public review of the proponent's application several issues associated with site design were raised. The project area currently supports use by residents and visitors interested in hiking and fishing. Comments on the proposal indicate local

concern that the project should not compromise the aesthetic appeal and integrity of the Kwoiek Creek watershed.

The site design of the proposed Kwoiek Creek Hydroelectric Project should recognize the existing and potential recreation and tourism use of the area.

Specification #45 - Recreation and Tourism Effects
The Project Report is to describe the potential impact of the project on recreation use of and public access to the Kwoiek Creek watershed.

2.5.3 Transportation Effects

Access to the Kwoiek Creek Hydroelectric Project site is from North Bend by Ministry of Transportation (MOT) unpaved road and BC Hydro right-of-way access road to Kwoiek Creek. A Forest Service road provides access up the Kwoiek Creek watershed.

MOT requires assurances that heavy equipment will not be placed on McCarthy Bridge #6484 or Twin Creek South #6509 greater than that permitted by their official loading capacity as determined by the MOT Area Manager.

The FVRD notes that public road access to the Kwoiek Creek areas should be provided and maintained as part of the project. Upgrades to the road system north of North Bend should involve input from local property owners and road users.

Specification #46 - Transportation Effects
The Project Report must include:

a) Proposed access for heavy equipment to/from the project area. This information is to be prepared in consultation with MOT;
b) A commitment that heavy equipment access to/from the project via McCarthy Bridge #6484 and Twin Creek South #6509 will not exceed MOT's official loading capacity - either these bridges will have to be improved or alternative access to the project site found for heavy equipment;
c) A commitment to involve public input from local property owners and road users before upgrades to the road system north of North Bend are undertaken; and
d) A description of how the project will avoid impacts on the Lytton Airport and air traffic in the area and meet requirements under the *Railway Safety Act*.

2.6 Land Use Issues

2.6.1 Lillooet LRMP

The proposed powerplant site is located within a General Resource Management Zone under the Lillooet Land and Resource Management Plan (LRMP). The Siska Resource Management Zone may require review and the Protected Area extension of Skihist Park may potentially impact proposed transmission line locations. The Lillooet LRMP planning process is not yet complete and the proponent is advised to consult

with the LRMP Working Table to ensure the project is consistent with the proposed land use designation.

Specification #47 - Lillooet LRMP
The proponent is to demonstrate in the Project Report that the proposed project does not conflict with proposed or approved land use designations.

2.6.2 Parks/Ecological Reserves

The Application does not include references to either Skihist Provincial Park or Skihist Ecological Reserve, both of which are located a few kilometres east of Lytton.

No option exists to grant a new right-of-way through parklands for this power transmission line. As Section 8 of the *Park Act* precludes the possibility of accommodating the transmission line, a route must be selected which does not involve alienation of parklands.

Specification #48 - Parks/Ecological Reserves
The Project Report is to:
a) Identify the location of all provincial parks, ecological reserves and protected areas in the vicinity of the project; and
b) Include an assessment of the visual effects of the transmission line from the viewpoints in provincial parks.

2.6.3 Zoning, Land Tenure and Related Issues

The subject site is zoned RL-1 (Rural). The Thompson-Nicola Regional District (TNRD) advised that a power house, tunnel, or penstock, switchyard and concrete weir/allied facilities are permitted uses in the RL-1 zone.

The Land Reserve Commission (LRC) advises that portions of the proposed transmission line (18 km of Option #1 and 3 km of Options #2 and #3 east of the Thompson River) are within the Agricultural Land Reserve (ALR). Project components at the mouth or Kwoiek Creek are not within the ALR or Forest Land Reserve (FLR).

Specification #49 - Zoning, Land Tenure and Related Issues.
The Project Report is to include:
a) The land status of all proposed application areas in order to identify any potential conflicts or problems with Crown land tenures or private land owners; and
b) The location of Agricultural Land reserve boundaries in the vicinity of the project.

Should the proponent receive EA approval for the Kwoiek Creek Hydroelectric Project, they are advised of the following Crown land approvals will be required:

- Construction or upgrading of existing non-status roads across Crown land;
- Any proposed gravel removal on Crown land;

- Crown land portions of the proposed powerline;
- Crown land portions of the penstock or tunnel options
- Any waste rock disposal areas on Crown land; and
- Any other uses or occupation on Crown land.

Should one of the options affecting the ALR be chosen, an application under the Agriculture Land Reserve Procedure Regulation 452/98 for any and all lands within the ALR must be submitted to the LRC. The LRC will not consider an application until the EA review is complete.

INAC advises that federal permit requirement will include:
- Timber Permit (for timber removal);
- Indian Reserve Waste Disposal Regulation permit (for waste disposal, including tunnel spoil deposition on reserve lands); and
- Designation, lease and permit for access and use of Indian Land.

The proposed penstock crossing of the Canadian Pacific (CP) Railway will require either an easement or R/W agreement with the owner.

2.7 Health Specifications

2.7.1 Sewage for Construction Camp

The Application refers to the possibility for construction contractors to opt for an on-site construction camp on IR4 because of the distance to commercial accommodation. The proponent will be required to comply with federal sewage disposal regulations.

Specification #50 - Sewage for Construction Camp
The Project Report is to identify the preferred location of the construction camp and adequately demonstrate that no adverse health impacts will result from construction camp sewage disposal.

2.7.2 Electric and Magnetic Fields (EMFs)

Public and First Nations concerns have been expressed regarding electric fields (associated with voltage) and magnetic fields (associated with current) encountered in the vicinity of electricity generation and transmission facilities. In particular, there are concerns that these electric and magnetic fields (EMFs) could be a health risk.

Specification #51 - Electric and Magnetic Fields (EMFs)
The Project Report is to:
a) Provide a summary of existing information and evidence of the potential effects of electric and magnetic fields (EMFs) from transmission lines on human health; and
b) Provide a project-specific qualitative assessment of EMFs and describe how they may impact residents in the vicinity of electricity generation and transmission facilities associated with the proposed project.